

(19)



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) Publication number:

**0 550 094 A2**

(12)

**EUROPEAN PATENT APPLICATION**(21) Application number: **92203955.7**(51) Int. Cl.<sup>5</sup>: **H01J 61/50**(22) Date of filing: **16.12.92**(30) Priority: **23.12.91 EP 91203378**(43) Date of publication of application:  
**07.07.93 Bulletin 93/27**(84) Designated Contracting States:  
**BE DE FR GB IT NL**(71) Applicant: **N.V. Philips' Gloeilampenfabrieken  
Groenewoudseweg 1  
NL-5621 BA Eindhoven(NL)**(72) Inventor: **Pragt, Henrikus Johannes Hubertus  
c/o Int. Octrooibureau B.V., Prof. Holstlaan 6  
NL-5656 AA Eindhoven(NL)**(74) Representative: **Rooda, Hans et al  
INTERNATIONAAL OCTROOIBUREAU B.V.  
Prof. Holstlaan 6  
NL-5656 AA Eindhoven (NL)**(54) **Electric lamp.**

(57) The electric lamp has an electric element (6) in a lamp vessel (2), which is mounted in an outer bulb (1). A glass sleeve (10) having an envelope (11) is surrounding the lamp vessel. The glass sleeve (10) is fused to a tipped off exhaust tube (5). A coiled wire (11) may be used as an envelope (11). The wire may be fixed to the sleeve (10) by clamping fit. The construction of the lamp is simple and effective to protect the outer bulb (1) from being damaged by an explosion of the lamp vessel (2).

**EP 0 550 094 A2**

The invention relates to a electric lamp comprising:

- an outer bulb closed in a gaslight manner;
- a lamp vessel closed in a gaslight manner and having an axis, seals on its axis, and an exhaust tube seal between said seals;
- a glass tube axially surrounding the lamp vessel;
- a member surrounding the tube;
- an electric element in the lamp vessel; and
- current conductors which extend from outside the outer bulb to the electric element and are connected thereto.

Such an electric lamp is known from EP 0 381 265-A. In the known lamp, the glass tube is mounted to the seals of the lamp vessel or to the current conductors which issue therefrom to the exterior. Metal plates which close in the tube between them are used for this. The glass tube is double-walled or is surrounded by a separate glass tube.

The construction of the known lamp envisages to keep the outer bulb intact if the lamp vessel should explode. Explosion is possible when the lamp reaches the end of its life.

Netherlands Patent Application 89 02 687-A discloses a similar lamp in which the glass tube is surrounded by a perforated metal foil.

The construction of the known lamps is reliable, but complicated and therefore expensive.

It is an object of the invention to provide an electric lamp of the kind mentioned in the opening paragraph which is of a simple construction.

According to the invention, this object is achieved in that the glass tube is fused to the exhaust tube seal of the lamp vessel.

It was found that the fusion of the glass tube to the exhaust tube seal constitutes a simple and reliable fastening of the tube in the lamp. No additional parts are necessary for this fastening, so that the manufacture of the lamp is logistically simpler and requires less assembling work.

The glass tube may have, for example, a known surrounding member, such as another glass tube, or a metal surrounding member, such as a perforated foil, or a metal or glass gauze or mesh.

A surrounding member which can be readily manufactured and mounted, and which in addition is light, however, consists of a helically coiled metal wire. This wire may be fastened to one of the current conductors, possibly electrically insulated therefrom. An alternative possibility, however, is that the wire is fastened to the tube, for example, in that wire ends are fastened to the tube with cement or are fused into the tube.

A very attractive, convenient and reliable fastening is one in which the wire is fastened to the tube by its own clamping force. The wire has in that case been coiled on a mandrel having a small-

er diameter than the tube and has been twisted against its coiling direction immediately before assembly so as to give its turns a greater diameter. After the wire has been provided around the tube, the twisting force is lifted and the wire will surround the tube with clamping fit.

In spite of the comparatively great pitch which the wire may have, for example, several mm, the wire provides a screening for the current conductor extending alongside the lamp vessel, thus counteracting the disappearance of sodium, if present, from the lamp vessel.

The electric element of the lamp may be, for example, a pair of electrodes in an ionizable gas filling.

An embodiment of the electric lamp according to the invention is shown in the drawing in side elevation.

In the Figure, the electric lamp has an outer bulb 1 which is closed in a gastight manner and a lamp vessel 2 which is closed in a gastight manner and which has an axis 3, seals 4 on its axis, and an exhaust tube seal 5 between said seals. A glass tube 10, for example made of quartz glass, axially surrounds the lamp vessel. The tube has a surrounding member 11. An electric element 6 is present in the lamp vessel, in the Figure this is a pair of electrodes in an ionizable medium. Current conductors 7 extend from outside the outer bulb to the electric element and are connected thereto.

The glass tube 10 is fused to the exhaust tube seal 5 of the lamp vessel 2. The tube may have a wall thickness of, for example, 1 mm or less.

The member 11 surrounding the tube 10 is a helically coiled metal wire. For this purpose, for example, resistance wire may be used, for example kanthal wire. In the lamp shown, wire of 0.25 mm diameter is used, coiled with a pitch of 5 mm. Alternatively, however, a thinner wire, for example of 0.2 mm, or a greater pitch may be used, for example 7 mm. The coiled wire is thin and has an open structure. Its influence on the luminous flux of the lamp, therefore, is scarcely perceivable.

The wire 11 is fastened to the tube 10 by its own clamping force.

The lamp shown is a high-pressure metal halide discharge lamp which contains metal halides, mercury, and rare gas. The lamp consumes a power of 70 W during operation. During stable lamp operation, the lamp vessel was made to explode by means of a current surge. The outer bulb remained entirely undamaged during this, which proves that the lamp construction effectively protects the surroundings against the consequences of a explosion of the lamp vessel.

An attractive feature of the shown lamp is that the glass tube is arranged so as to be electrically insulated from the current conductors. The member

surrounding the tube is also electrically insulated. Disappearance of sodium, if present, from the discharge vessel is effectively counteracted by this. If an electron should be detached from the wire by UV radiation, the wire is given a positive potential which slows down further electron losses.

## Claims

1. An electric lamp comprising:
  - an outer bulb (1) closed in a gastight manner;
  - a lamp vessel (2) closed in a gastight manner and having an axis (3), seals (4) on its axis, and an exhaust tube seal (5) between said seals;
  - a glass tube (10) axially surrounding the lamp vessel;
  - a member (11) surrounding the tube;
  - an electric element (6) in the lamp vessel;
  - and
  - current conductors (7) which extend from outside the outer bulb to the electric element and are connected thereto,
 characterized in that the glass tube (10) is fused to the exhaust tube seal (5) of the lamp vessel (2).
2. An electric lamp as claimed in Claim 1, characterized in that the member (11) surrounding the tube (10) is a helically coiled metal wire.
3. An electric lamp as claimed in Claim 2, characterized in that the metal wire (11) is fastened to the tube (10).
4. An electric lamp as claimed in Claim 3, characterized in that the metal wire (11) is fastened to the tube (10) by its own clamping force.

